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## REMARKS/ARGUMENTS

The Examiner has now issued a sixth office action in this case.

The claims have not substantively changed over those originally filed.

Applicant, once again, respectfully, but most strongly objects, to the Examiner's piecemeal prosecution of this application.

Evidence of the piecemeal prosecution is apparent from reviewing the last office action with the present office action.

In the immediate prior office action, the Examiner rejected Claims 1, 2, 14-16, 20-23, 35-37, 41-44, 51-54, 56-58, and 62-63 stand under 35 U.S.C. 103 (a) as being unpatentable over the '819 patent in view of U.S. Patent 6,799,864 ('864) {Bohler} "and as evidenced by Roberts et al. U.S. Patent Application Publication 20020149312."

In this office action, Claims 1-12, 14-33, 35-54 and 55-63 stand rejected under 35 U.S.C. 103(a) over the '819 patent in view of Bohler (6,799,864)

## STATUS OF APPLICATION

Claims 1-12, 14-33, 35-54 and 55-63 are in the application.

Claims 1-12, 14-33, 35-54 and 55-63 stand rejected under 35 U.S.C. 103(a) over the '819 patent in view of Bohler (6,799,864)

Applicant again traverses the rejection as modified.

### The '819 Patent

The Examiner relies upon the '819 patent as the primary reference for rejecting all claims in the application.

It is respectfully submitted that the '819 patent does not anticipate or make obvious the novel structures of Applicant's invention as claimed.

### The '819 patent teaches away from Applicant's novel structures.

The '819 patent is directed to the dissipation of heat away from a printed circuit board and relies upon heat conduction through the printed circuit board from the copper bonding pads for the LEDs to a metal layer plated on the bottom of the pc board and then to a heat sink.

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The specific problem to which the '819 patent is set out beginning at col. 1, line 60. The '819 patent teaches that heat from a LED chip is eliminated via the electrical terminal of the LED. Depending on the LED structure to which the teachings of '819 are addressed, the heat is conducted by the electrical terminal onto solder points that are on copper solder pads on a printed circuit board. **"From the solder points, the heat at first propagates in the copper pads and then on the epoxy resin material in the plane of the printed circuit board. Subsequently, the heat is output large-area to the environment by thermal radiation and thermal conduction."** (col. 2, lines 2-7)

The '819 patent continues on to state that the **thermal resistance for one LED on a pc board is relatively slight, but becomes significant when many LEDs are "arranged in close proximity on a circuit board."** (Col 2, lines 11-12). This is explained in the '819 patent as a result of a **"smaller percentual area of the PCB is now available for each individual LED for heat transmission to the environment."**

"An object of the ('819) invention is to specify a surface-mounted LED arrangement that is distinguished by an improved heat elimination from the LEDs." (Col. 2, lines, 37-39)

The structures of the '819 patent are each a printed circuit board having surface mounted LEDs on one side of the circuit board, the side of the board opposite the LEDs has a metallic layer that is electrically insulated from the LEDs by the circuit board. The metal surface is applied to a cooling member. The cooling member is copper or aluminum or a cooling plate. The cooling member is secured to the circuit board by thermally conductive adhesive. (Col. 2, lines 44-62)

**The printed circuit board is of plastic material that conducts heat poorly.** (Col. 2, lines 63-65)

The copper pads on the circuit board "should be as large as possible in order to broaden the heat path through the printed circuit board material. (Col. 3, lines 6-9).

It is clearly apparent that **the teachings of the '819 patent are directed to and limited to a structure in which a circuit board carries the LEDs.** The LEDs are soldered to metal pads on the same surface of the circuit board. Heat is transferred from the pads, through the circuit board to a metal surface on the other surface of the circuit board, through an adhesive layer to a cooling member.

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Thus, the structures of the '819 patent require that the LEDs are carried on copper solder pads on one surface of a circuit board and heat transfer is via solder pads through the circuit board to a metallization layer on the opposite surface of the circuit board and then to the cooling member via an adhesive layer.

**The LEDs are not carried by the cooling member.**

The '819 patent shows and teaches structures that are fundamentally different from Applicant's claimed invention.

More specifically, the structures shown and described in the '819 patent all utilize surface mount LEDs. The LEDs are mounted to and carried on one surface of a thermally and electrically insulating printed circuit board. More specifically, the printed circuit board is a plastic material. A cooling member is provided on the other surface of the PC board. The printed circuit other surface is secured to the cooling member.

**PRESENTED AND CLAIMED EMBODIMENTS**

The embodiment of the present invention shown in FIG. 1A contains a printed circuit board 1 on which a plurality of preferably surface-mounted LEDs 2 are applied. In a known way, the printed circuit board 1 thereby forms a circuit that comprises terminal surfaces for the mounting of the LEDs at defined locations. These terminal surfaces are provided, for example, with lands for soldering in an automatic surface mount device (SMD) equipping unit, and the LEDs 2 have their electrical contacts 2a soldered to these terminal surfaces in a subsequent mounting step.

The printed circuit board 1 can be a rigid printed circuit board, such as type FR4, and constructed of an epoxy resin

It is clearly evident that the printed circuit board is plastic or epoxy and is not a thermal conductor. This is explicitly stated at col. 3, lines 1-5

flexible plastic. For example, it can be composed of polyester or polyamide film, or it may comprise what is often referred to as flex-board. Flex board is generally multi-layer printed circuit boards that are uniformly constructed of a plurality of polyamide carrier films.

**FR4 circuit board material as well as "flex board" of polyester and polyamide are well know thermal insulators.**

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The relevant structure of the devices of the '819 patent are clearly set out in claim 1 of the '819 patent:

1. A surface-mounted LED arrangement, comprising:
  - a printed circuit board having a principal surface and a secondary surface, said printed circuit board comprising a plastic material, 20
  - a plurality of LEDs arranged on said principal surface,
  - a metallic layer provided on said secondary surface that is electrically insulated from said plurality of LEDs,
  - a cooling member connected to said secondary surface, 25  
wherein said printed circuit board is secured to said cooling member with at least one of a thermally conductive paste, a thermally conductive adhesive and a thermally conductive film, and

### 35 USC 103 REJECTION

Claim 1, recites, inter alia: A light source comprising: an elongate thermally conductive member having an outer surface: at least one solid state light source carried on said elongate member outer surface...”;

Claim 2, recites, inter alia: A light source comprising: an elongate thermally conductive member having an outer surface: a plurality of solid state light sources carried on said elongate member outer surface...”;

Claim 22, recites, inter alia: A radiation emitting source comprising: an elongate thermally conductive member having an outer surface: at least one radiation emitting semiconductor device carried on said elongate member outer surface;

Claim 23, recites, inter alia: A radiation emitting source comprising: an elongate thermally conductive member having an outer surface: a plurality of radiation emitting semiconductor devices carried on said elongate member outer surface...”;

Claim 43, recites, inter alia: A radiation emitting source comprising: an elongate thermally conductive member having an outer surface: at least one radiation emitting solid state device carried on said elongate member outer surface...”;

Claim 44, recites, inter alia: A radiation emitting source comprising: an elongate thermally conductive member having an outer surface: a plurality of radiation emitting solid state devices carried on said elongate member outer surface...”;

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The Examiner only applies the Bohler reference to claims 15, 16, 21, 36, 37, 42, 57, 58 and 63.

The Examiner does not apply the Bohler reference with respect to independent claims 1, 2, 22, 23, 43, and 44.

FIG. 2B of the '819 patent does not show an elongate structure. The Examiner apparently now acknowledges that neither Fig. 2B nor the description of FIG. 2B shows, teaches or describes any structure that is clearly elongate. Similarly none of the drawings 1A, 2A, 2B, 2D show elongate members since they are all cross sections and as such show only at best a portion of one of the length or width of the member 3. FIG. 1B shows the only PC board 1 in its entirety and the structure is square not elongate. The squareness of the structure of FIG. 1B is easily determined by measuring the length and width of the structure. Little can be determined from the drawing of FIG. 2C since neither the drawing nor description shows the cooling member or members 3.

The Examiner fails to point to any teaching or description in the '819 reference that shows "at least one solid state light source carried on said elongate member outer surface" nor does the Examiner even mention this structural limitation set forth in the independent claims. To the contrary, the Examiner, at the bottom of page 2 of the office action states that tubular cooling member 3 carries flexible pc 1 which in turn carries the LEDs.

It is clear from a plain reading of the descriptions of the structures in the '819 patent that the printed circuit board 1 carries LEDs 2 on one surface and carries the heat sink 3 on its opposite surface.

In other words, the '819 patent teaches away from the novel structures of applicant's claimed invention which set forth structure in which the LEDs, solid state light sources, radiation emitting semiconductor devices, and radiation emitting solid state devices are carried on the elongate thermally conductive member.

No elongate thermally conductive member having an outer surface carrying LED's is shown, taught or suggested in the '819 patent. The '819 patent teaches an insulating PCB carries the LEDs and a thermally conductive member (3) carries the PCB.

The Examiner concedes this point that the '819 patent fails to show teach or describe an elongate thermally conductive member having an outer surface carrying LED's when he states:

"...said cooling member ...carrying a flexible printed circuit...which in turn carries a plurality of solid state light sources...."

For the foregoing reasons, the '819 patent fails to show, teach or anticipate the novel structures set forth in claims 1, 2, 22, 23, 43, and 44.

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In addition, the independent claims recite:

CLAIM 1.

said elongate thermally conductive member being configured to conduct heat away from said at least one solid state light source to fluid contained by said elongate thermally conductive member.

CLAIM 2.

said elongate thermally conductive member being configured to conduct heat away from said solid state light sources to fluid contained by said elongate thermally conductive member.

CLAIM 22.

said elongate thermally conductive member being configured to conduct heat away from said at least one radiation emitting semiconductor device to fluid contained by said elongate thermally conductive member.

CLAIM 23.

said elongate thermally conductive member being configured to conduct heat away from said radiation emitting semiconductor devices to fluid contained by said elongate thermally conductive member.

CLAIM 43.

said elongate thermally conductive member being configured to conduct heat away from said at least one radiation emitting solid state device to fluid contained by said elongate thermally conductive member.

CLAIM 44.

said elongate thermally conductive member being configured to conduct heat away from said radiation emitting solid state devices to fluid contained by said elongate thermally conductive member.

The Examiner wrongly states that:

said thermally conductive member being configured to conduct heat away from said solid state light sources ...to fluid contained by said thermally conductive member."

It is clear from the plain language teachings of the '819 patent that the thermally conductive member is configured to conduct heat away from the flexible printed circuit as inferentially acknowledged by the Examiner at the bottom of page 2 of the office action.

On this additional basis, claims 1, 2, 22, 23, 43, and 44 are not shown, taught or made obvious by the structures shown and taught in the '819 patent.

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Yet further, the Examiner wrongly states that:

since a change in size and shape is recognized as being within the level of ordinary skill in the art (MPEP 2144.04 [R-1], section IV) a modification to change the tubularly shaped cooling member 3 ...to have a length more than a width would have been obvious to one of ordinary skill in the art...."

The Examiner has misplaced reliance on MPEP 2144.04. Relevant portions of MPEP 2144 and 2144.04 are set forth below:

#### 2144

Sources of Rationale Supporting a Rejection Under 35 U.S.C. 103 [R-5]

RATIONALE MAY BE IN A REFERENCE, OR REASONED FROM COMMON KNOWLEDGE IN THE ART, SCIENTIFIC PRINCIPLES, ART-RECOGNIZED EQUIVALENTS, OR LEGAL PRECEDENT

The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law....

#### LEGAL PRECEDENT CAN PROVIDE THE RATIONALE SUPPORTING OBVIOUSNESS ONLY IF THE FACTS IN THE CASE ARE SUFFICIENTLY SIMILAR TO THOSE IN THE APPLICATION

The examiner must apply the law consistently to each application after considering all the relevant facts. If the facts in a prior legal decision are sufficiently similar to those in an application under examination, the examiner may use the rationale used by the court. If the applicant has demonstrated the criticality of a specific limitation, it would not be appropriate to rely solely on case law as the rationale to support an obviousness rejection.

#### 2144.04 Legal Precedent as Source of Supporting Rationale [R-1]

As discussed in MPEP § 2144, if the facts in a prior legal decision are sufficiently similar to those in an application under examination, the examiner may use the rationale used by the court. Examples directed to various common practices which the court has held normally require only ordinary skill in the art and hence are considered routine expedients are discussed below. If the applicant has demonstrated the criticality of a specific limitation, it would not be appropriate to rely solely on case law as the rationale to support an obviousness rejection.

#### 2144.04

##### A. Changes in Size/Proportion

*In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955) (Claims directed to a lumber package "of appreciable size and weight requiring handling by a lift truck" where held unpatentable over prior art lumber packages which could be lifted by hand because limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art.); *In re Rinehart*, 531 F.2d 1048,

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189 USPQ 143 (CCPA 1976) ("mere scaling up of a prior art process capable of being scaled up, if such were the case, would not establish patentability in a claim to an old process so scaled." 531 F.2d at 1053, 189 USPQ at 148.).

In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

With respect to *In re Rose*, the present invention does not deal with limitations in size and weight as set forth therein; nor does the present invention pertain to mere scaling up of a prior art process as set forth in *In re Rinehart*; nor is the present case an instance where the only difference between the prior art and the instant claims relative dimensions, and in addition, a structure that is elongate performs differently from a structure that is not elongate with respect to transfer of heat.

Accordingly, there is no basis for the Examiner's contention that MPEP 2144.04 supports a finding that changing the dimensions would be obvious.

For this additional reason, claims 1, 2, 22, 23, 43, and 44 are not shown, taught or made obvious by the structures shown and taught in the '819 patent.

All of the claims in the application depend from base claims 1, 2, 22, 23, 43, and 44. For the same reasons that the base claims are not shown, taught or made obvious by the '819 patent, these claims that add additional limitations are not shown, taught or made obvious by the '819 patent alone or in combination with Bohler.

With respect to claims 15, 16, 21, 36, 37, 42, 57, 58 and 63, the Examiner relies upon Bohler as showing forming apertures in a printed circuit board so that each LED may be disposed in an aperture such that each LED is affixed in thermally conductive contact with a metal substrate "for the purpose of incorporating high powered LEDs into a light source."

The Examiner's proposed modification of the '819 patent does violence to the teachings of the '819 patent. The entirety of the '819 patent is to improve heat dissipation through a printed circuit board. There is no suggestion in the '819 patent that there be through holes. The structure disclosed in the '819 patent is directed to the dissipation of heat from a plurality of LEDs mounted on a PCB. Similarly, there is no suggestion in Bohler that its teachings may be applied to the structure of the '819 patent. The only suggestion to modify the structure of the '819 patent comes from a hindsight application of the structure of Applicant's novel structure.



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The Examiner's attention is directed to MPEP 2144.04 VI. C. which states, in part:

"The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rowhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

There is no suggestion in either reference to modify the structures of the '819 patent as the Examiner suggests. Rather, the Examiner in an exercise of hindsight based upon Applicant's disclosure has modified the disclosures of both references. Such an approach to finding obviousness is not a valid approach.

It is respectfully submitted that the Examiner has failed to follow the factual inquiries set forth in *Graham v John Deere*.

"The factual inquiries set forth in *Graham v. John Deere Co.*, 148 USPQ 459, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or unobviousness."

It is inherent in these inquiries that the Examiner must have an evidentiary basis for the determinations made. The Examiner must consider each piece of prior art for what it fairly teaches within its four corners.

It is respectfully submitted that the Examiner has failed to properly determine the differences between the prior art and the invention as claimed.

The Examiner makes no effort to resolve the level of skill of one skilled in the lighting arts.

For these additional reasons, claims 15, 16, 21, 36, 37, 42, 57, 58 and 63 are not shown, taught or made obvious by either reference taken singly or in combination.

In addition, the Examiner in rejecting claims 4, 9, 25, 30, 46, and 51; and 10, 31, and 52 states that thermally conductive member (3) of the '819 patent comprises an extrusion pointing to col. 2, lines 55-62, and further that the extrusion is an aluminum extrusion.

The Examiner has apparently misread the '819 reference. The words "extrusion" and "extruded" do not appear anywhere in the '819 reference. The Examiner makes an

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impermissible leap that the aluminum plate shown and described is an extrusion. The operative portion of the '819 patent (col. 2, lines 55-62), in its entirety states:

The cooling member can be composed of copper or aluminum or of a cooling plate, and the printed circuit board is preferably secured to it with a thermally conductive paste, a thermally conductive adhesive, a thermally conductive film or the like. It should enable an optimally good heat dissipation at its back side. To this end, for example, it can be painted black and/or comprise cooling ribs and/or a rough surface.

From the mere suggestion of the three underlined words, the Examiner makes the leap that the reference discloses "one or more heat dissipation protrusions or extrusions." However, there is no enabling disclosure made of such in the '819 patent.

In addition, from those three words, the Examiner then constructs a modified FIG. 2B drawing with ribs that the Examiner adds.

The Examiner then, in reliance, not on the '819 reference, but on the Examiner's own drawing constructed utilizing hindsight, utilizes his drawing to reject claims.

The Examiner's exercise in constructing a disclosure from the reference is not a permissible examination.

MPEP 2143.01 provides the guidance that the proposed modification of the prior art cannot change the principle of operation of the prior art reference.

It is respectfully submitted that the Examiner pay attention to the examination standards for determination of obviousness. The Examiner's attention is drawn, in particular, to MPEP 706.02(j) and MPEP 2143 and the three basic criteria that must be set out to establish a prima facie case of obviousness.

The first criterion is that "there must be some suggestion of motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings."

"Second, there must be a reasonable expectation of success."

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicants disclosure." MPEP 2143 quoting *In re Tack*

MPEP 706.02(j) quotes *Ex Parte Clapp*: "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention, or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to be obvious in light of the teachings of the references."

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The '819 patent is absolutely silent on extrusions and on aluminum cooling ribs that are extrusions.

For these additional reasons, claims 4, 9, 25, 30, 46, and 51; and 10, 31, and 52 are not shown, taught or made obvious by either reference taken singly or in combination.

The Examiner further compounds the failure to consider what the '819 reference teaches within its four corners with the rejection of claims 7, 8, 17, 18, 28, 29, 38, 39, 49, 50, 59, and 60 as set forth on the bottom of page 3 where the rejection is based upon the Examiner's "interpretation" of the Examiner generated modified Fig. 2b of the '819 reference.

Repeating from above: "Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicants disclosure." MPEP 2143 quoting *In re Tack*

The Examiner's rejection is not based on the teachings of the prior art, but is based on the Examiner's interpretation of three words of a non-enabling disclosure in the '819 patent that the Examiner utilizes to modify the drawing of the '819 patent and then interpret the drawing the Examiner modified. Such an approach is absolutely wrong and contrary to the examination approach set out in the MPEP and in case law.

The Examiner's rejection is improper and it is requested that the Examiner withdraw the rejection.

For these additional reasons, 4, 9, 25, 30, 46, and 51; and 10, 31, and 52 are not shown, taught or made obvious by either reference taken singly or in combination.

Still further, the Examiner's rejection of claims 19, 40 and 61 is traversed.

The Examiner, in rejecting these claims states that "providing a clip...is considered an intended use and therefore...obvious...."

The Examiner has provided no basis for this rejection nor any analysis based upon prior art in support for "intended use" nor has he pointed to any suggestion or teaching of the use of a clip in the references. Accordingly, it is respectfully submitted that the Examiner has failed to follow the factual inquiries set forth in *Graham v John Deere*.

The Examiner has in the prior office action stated that the reference does not show a clip. The reference also does not show any way to mount "an elongate thermally conductive

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member." It is therefore submitted that the Examiner's rejection of claims 19, 40, and 61 fails to meet the requirements of *Graham*.

It is respectfully submitted that the Examiner has failed to properly determine the differences between the prior art and the invention as claimed.

For these additional reasons, claims 19, 40, and 61 are not shown, taught or made obvious by either reference taken singly or in combination.

It is respectfully submitted that none of the claims presently in the application are shown, taught or made obvious by any of the references cited taken singly or in any combination.

Reexamination and reconsideration are requested. It is further requested that the claims be allowed and the application be passed to issue. It would be appreciated to receive an early notice of allowance.

Should there be any issues that may be resolved telephonically, the Examiner is invited to call the undersigned at 602-463-2010.

Respectfully submitted,

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